

METHOD AND APPARATUS FOR DISPLAYING BANNERS ON A TV SCREEN

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a method and apparatus for displaying banners on a TV screen and, more particularly, to a set-top box, and the method used in the set-top box for displaying banners on the TV screen.

2. Description of Related Art

10 Currently, set-top boxes are used with TV sets. Users can use a set-top box to receive the network signal (e.g. signal from internet) through the network interface of the set-top box, receive the TV signal over the tuner of the set-top box, and receive the video or CD-ROM drive signal over the AV terminal of the set-top box. Therefore, users can selectively switch to the TV-mode for watching TV programs, to the network-mode for connecting
15 to the network, or to the AV-mode for watching videos or VCDs. Since the set-top box has computer capabilities, users can directly connect to a network via the set-top box without using a computer. Thus it is also good for promoting information appliances (IA). However, the conventional set-top box is only applied to the process of switching signals among
20 network signals, the TV signals, or other image signals. System providers or distributors cannot transmit any information, such as advertisements, to customers over set-top boxes to receive profit from advertisement. Therefore, the price of a set-top box is still too high to become popular.

25 Therefore, it is desirable to provide a method and apparatus for displaying banners on a TV screen that mitigates the aforesaid problems.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a method and apparatus for displaying banners on a TV screen so that users can use the set-top box not only for connecting to networks but also for receiving banner information while watching TV programs, videos, or VCDs. By displaying banner information on a TV screen to receive profit, System providers or distributors can reduce the cost of the set-top box to benefit users and facilitate the promotion of the set-top box.

To achieve the object, the method for displaying banners on a TV screen of the present invention comprises the steps of:

- (A) receiving at least a TV-transmitted image signal, a video-transmitted image signal, or a CD (e.g. VCD, DVD) drive-transmitted image signal;
- (B) processing the image signal to obtain a size-reduced image signal so that the size-reduced image signal displayed on the TV screen is reduced in size, and positioning the size-reduced image signal on the TV screen;
- (C) receiving the banner information via the network;
- (D) processing the banner information to obtain a banner image signal, and positioning the banner image signal on the TV screen; and
- (E) outputting the size-reduced image signal and the banner image signal to the TV set.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic drawing according to the present invention.

FIG. 2 is a block diagram showing the hardware architecture of a set-top box according to the present invention.

5 FIG. 3 is a schematic drawing showing programs stored in a memory device according to the present invention.

FIG. 4 is a flow chart of the steps required for a set-top box to display banners on a TV screen according to the present invention.

10 FIG. 5 is a schematic drawing showing banner image signals displayed on a TV screen according to the present invention.

FIG. 6 is a flow chart illustrating a banner-processing program according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

15 With reference to FIG. 1, there is shown a schematic drawing according to the present invention. The set-top box **10** is coupled to a TV set **30**. The set-top box **10** can receive the network signals **51**, the TV signals **52**, or other image signals **53** transmitted by an image device coupled to the TV set **30**. The image device could be a video, a CD-ROM drive, a DVD player, or other image devices without departing from the scope and spirit of the invention. Therefore, users can use the TV set **30** to watch TV programs, connect to the network (e.g. internet) to surf websites, or watch other image programs provided by other image devices.

25 The hardware architecture of the aforesaid set-top box **10** is shown in FIG. 2. Similar to the hardware architecture of a personal computer, the set-top box **10** comprises a microprocessor **11**, a system bus **111**, a memory device **12** (for example, a hard disk drive, or a memory interface card), a

voice-processing unit 13, and an image-processing unit 14. A person skilled in the art can easily achieve this hardware architecture, so the details of hardware are not disclosed hereinafter. The hardware architecture of the set-top box 10 is similar to a personal computer with the exception of having an infrared receiver 15, a network interface 16, a tuner 17, an AV terminal 18, and an input device 19 (for example, a remote controller). The network interface 16 can receive the network signals 51 (for example, the signal transmitted via the internet); the tuner 17 can receive the TV signals 52; the AV terminal 18 can receive other image signals 53 such as signals from the video or the CD-ROM drive.

The software programs stored in the memory device 12 of the present invention is outlined hereinafter with reference to FIG. 3. Similar to the hardware architecture of a personal computer, the memory device 12 of the set-top box 10 basically comprises a system program 121, and a browser 122. However the memory device 12 further comprises an image size and position processing program 123, a banner processing program 124, and a banner file 125. The function of the programs or files described above specially designed for the present invention will be mentioned in detail hereafter.

The set-top box 10 of the present invention connects to the network for receiving banner information so the TV screen 31 displays images carrying banner information. FIG. 4 is a flow chart of the steps required for the set-top box 10 to display banners on the TV screen 31. At the beginning, the set-top box 10 receives the image signal (S401). The image signal may comprise a TV-transmitted image signal, a video-transmitted image signal, a CD (e.g. VCD, DVD) drive-transmitted image signal, or the like.

Because the TV screen **31** can display banners, the window of the TV screen **31** is divided into two parts as shown in FIG. 5. One is the image signal window **311** for displaying image signals or network signals **51**, and the other is the banner image signal window **312** for displaying banner image signals **21** and **22**.

In order to display image signals received in step S401 on the image signal window **311**, the set-top box **10** has to process the image signal to obtain a size-reduced image signal (S402) so that the size-reduced image signal displayed on the TV screen **31** is reduced in size. And then the set-top box **10** arranges the position of the size-reduced image signal on the image signal window **311**(S403). As described above, steps S402 and S403 are executed by the image size and position-processing program **123** mentioned in FIG. 3.

The set-top box **10** can also receive the network signals **51** in step S401. However, the network signals **51** do not need to be processed to obtain a size-reduced network signal in step S402 because the network signals **51** can be displayed on the TV screen **31** without being influenced by the size of the window of the TV screen **31**. And then the set-top box **10** arranges the position of the network signals **51** displayed on the image signal window **311** as described in the step S403.

The set-top box **10** receives banner information via the network (S404), wherein the URL (Universal Resource Locator) for obtaining banner information has been predetermined by the set-top box **10**. Therefore, the set-top box **10** can directly hyperlink to the server according to the IP address of the URL to receive banner information, and then saves the banner information in the banner file **125** mentioned in FIG. 3. At this

time, the set-top box **10** processes banner information to obtain banner image signals **21** and **22** (S405), and positions the banner image signals **21** and **22** displayed on the TV screen **31** (S406). The banner image signals **21** and **22** are positioned in the banner image signal window **312**. Steps S405 and S406 are processed by the banner processing program **124** mentioned in FIG. 3. After processing image signal and banner information, the set-top box **10** outputs the size-reduced image signal to the image signal window **311** and banner image signals **21** and **22** to the banner image signal window **312** respectively (S407).

With reference to FIG. 6, there is shown a detailed flow chart illustrating the banner-processing program **124**. The situation disclosed in FIG. 4 assumes that the network is connected. However, in reality users may turn on the TV set **30** at first without connecting to the network, or the network fails to connect. So the set-top box **10** has to determine whether the network is initially connected (S601). If the network is successfully connected, the set-top box **10** can download banner information via the network (S602). After downloading banner information, the set-top box **10** stores banner information in the banner file **125** to update the banner file **125** (S603). Further, the set-top box **10** can retrieve the updated banner information from the banner file **125** and process the banner information to produce banner image signals **21** and **22**, and then display banner image signals **21** and **22** on the banner image signal window **312** (S604). Since banner information provided by advertisers would be continuously updated, the set-top box **10** updates banner information after a predetermined elapsed time. The predetermined elapsed time can be one or two hours, or it can be counted in minutes or seconds. When the

predetermined elapsed time exceeds the predetermined time (S605), the set-top box **10** will execute the procedure from step S601 to step S605, and the elapsed time is set to zero upon completion of step S605. In step S601, if the network is not connected, the set-top box **10** could retrieve and receive the previously stored banner information from the banner file 125 (S606). So the set-top box **10** processes the pre-stored banner information stored in the banner file 125 and continuously checks the network condition. After the network is connected, the set-top box **10** can update the banner file 125.

With reference to FIG. 5, there is shown a schematic drawing showing banner image signals **21** and **22** displayed on the TV screen **31**. In this embodiment, the size of the image signal window **311** is reduced to 86 percent of the full TV screen **31**. So the TV signals **52** or other image signals **53** displayed on the image signal window **311** are reduced to 86 percent of its original size, and the network signals **51** displayed on the image signal window **311** are 100 percent of its original size. In addition, the size of the image signal window **311** is not limited as described above.

In this preferred embodiment, the TV screen **31** is divided into two parts, one is on the top side of the TV screen **31** called the banner image signal window **312**, and the other is on the bottom side of the TV screen **31** called the image signal window **311**. Of course the arrangement of the image signal window **311** and the banner image signal window **312** shown on the TV screen **31** are not limited as described above. They can be changed such as the image signal window **311** can appear on the left side of the TV screen **31**, and the banner image signal window **312** can appear on the right hand side of the TV screen **31**, or the like. In addition to banner

images **21** and **22**, the banner image signal window **312** further comprises a tool bar **23** enabling users to switch to TV-mode, hyperlink to their home page, browse the previous or next page, or choose other functions designed for satisfying the needs of users. The banner image signals window **312** comprises not only two banner image signals, wherein banner image signals could be GIF, JPG, JPEG, or BMP files. Banner image signals also comprise the URL path for users to hyperlink to the website of the advertiser.

Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.